Claims

1 Device (10) for measuring flexural damping in a fibre (1) comprising a transducer (6) driven by an input signal (13) to excite the fibre (1) laterally at different frequencies (F), such that the fibre (1) vibrates perpendicular to its axis (x2, z2) about a rest position, and a sensor (4) to detect fibre motion in order to measure phase delay between the input signal (13) and a output signal (14) of the sensor (4).

2 Device (10) according to claim 1, **characterized in that** the transducer (6) is mechanically connected to the fibre (1), such that one end (17) of the fibre (1) is deflected parallel in a first direction (z1) and/or such that one end (17) of the fibre (1) is rocked around a first axis (R).

3 Device (10) according one of the previous claims, **characterized in that** the transducer (6) is mechanically connected to a clamp (20) for clamping the fibre (20) at a first end (17).

4 Device (10) according one of the previous claims, **characterized in that** the transducer (6) is a piezoelectric transducer or an electromagnetic transducer or an electrical motor or a capacitive transducer for exciting the fibre (1).

5 Device (10) according to claim 4, **characterized in that** the transducer (6) comprises a clamp (20) for clamping the fibre (1) or comprises a surface for fixing the fibre (1) by the use of glue.

6 Device (10) according to one of the previous claims, **characterized in that** the sensor (4) is a light barrier comprising a light emitter (2) generating a light beam (5) and a light receiver (3) arranged such that the light beam (5) is interrupted by the fibre (1) during vibration (x2, z2).

7 Device (10) according to claim 6, characterized **in that** the sensor (4) comprises an adjustable aperture (29) to adjust the sensor (4).

8 Device (10) according to claims 6 or 7, characterized **in that** the light emitter (2) in the light barrier (4) is a laser or a photo diode.

9 Device (10) according to one of the previous claims, **characterized in that** a first transducer (6.1) is arranged such that a first fibre (1.1) is arranged in a general z-direction, parallel to earth gravity and a second transducer (6.2) is arranged such that a second fibre (1.2) is arranged in a general x-direction, perpendicular to earth gravity.

10 Device (10) according to one of the claims 1 to 9, **characterized in that** a transducer (6) is arranged movable between a first vertical position, such that fibre (1) is arranged in general z-direction, parallel to earth gravity, and a second horizontal position, such that a fibre (1) is arranged in a general x-direction, perpendicular to earth gravity.

11 Device (10) according to one of the previous claims, **characterized in that** the device (10) is arranged in an environmental chamber (26) comprising means to control the temperature (30, 39) and/or to means to control the pressure (32, 34) and/or to means to control the humidity (36, 38) inside of the chamber (26).

12 Method of measuring the flexural damping in a fibre (1) using the device according to one of the claims 1 to 11, comprising the following steps: Mechanically connecting the fibre (1) to a transducer (6); inducing flexural vibration into the fibre (1); carrying out a fast scan with the excitation signal (13) varying over a wide range of frequencies (F) in order to identify a resonance frequency ($F_{0,Res}$) of the fibre (1); performing a series of measurement at frequencies (F) around the resonance frequency ($F_{0,Res}$) found; analysing the acquired data in order to determine the phase curve (12) and its slope (α).

13 Method for determining a phase curve (12) of a resonant system from the periodic disturbance in the electrical signal (14) of a sensor (4) due to the motion of the vibrating structure (1), comprising the following steps: Inducing a vibration into the system to be measured (1); carrying out a fast scan with the excitation signal (13) varying over a wide range of frequencies (F) in order to identify a resonance frequency ($F_{0,Res}$) of the system (1); performing a series of measurement at frequencies (F) around the resonance frequency ($F_{0,Res}$) found; analyzing the acquired data in order to determine the phase curve (12) and its slope (α).